

Oil and Gas Developments in Pennsylvania in 1972

by William S. Lytle

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ABSTRACT

During the past two years about six million acres in Pennsylvania have been leased for the exploration and development of petroleum reserves. More seismic activity took place in 1972 in the Commonwealth than during any other previous year with most of it done by Vibroseis. Seismic crews logged 263 crew weeks in 29 counties, costing the operators over \$4,000,000. Oil and gas well drilling increased 40 percent over that of 1971. Oil and gas production and oil reserves decreased while gas reserves increased. The price of crude oil jumped 60 cents a barrel, while new gas is being bought by one company at 60 cents per Mcf.

The total number of highlight wells increased from 78 in 1971 to 86 in 1972. The most active gas area was in Indiana County with 160 new wells, up 61 wells from 1971. Again Venango and Warren Counties were the most active oil areas with 209 and 128 wells drilled respectively.

Pennsylvania grade crude oil production amounted to 3,363,000 barrels while production of Corning grade crude was 78,000 barrels or 13,000 barrels more than in 1971. Shallow gas production decreased 3 percent to 61,838 MMcf, and deep gas was down 6 percent to 12,120 MMcf. Gas storage capacity increased to 763,183 MMcf, and stored gas reserves decreased 1 percent to 606,941 MMcf.

Other wells completed, including service, gas storage and old well workovers, decreased 16 percent in 1972. The total of all wells reported in 1972 was up by 205 wells, or 21 percent greater than the 1971 total.

Of the 901 primary wells reported, 66 were exploratory and 835 were development. This is a 200 percent increase in exploratory wells and a 35 percent increase in development wells from 1971. Exploratory completions were 35 percent successful and development completions 98 percent successful, an increase of 77 percent and 3 percent respectively.

Exploratory footage was up 252 percent and development footage 42 percent from 1971. The average depth of all wells was 1,958 feet, 113 feet deeper than in 1971.

Secondary and tertiary recovery projects remained active. The several exhaust-drive projects being operated under a single management were shut down with no explanation.

INTRODUCTION

Progress Report 178, *Representative Gamma-Ray Logs from Shallow and Deep Wells, Western Pennsylvania*, should be referred to for stratigraphic information. This publication contains three shallow gamma-ray logs (two from the oil belt and one from the gas fields), and one deep gamma-ray log on which shallow and deep producing intervals have been designated.

Wells with good completions or of special note for other reasons in the Commonwealth in 1972 are discussed in Part I of this annual report. Part II contains the statistics and review of industry activities for the year, and Part III is the summarized record of the 1972 deep wells.

ACKNOWLEDGEMENTS

The writer acknowledges the cooperation of the Bradford District Producers Association, the Oil and Gas Division of the Bureau of Land Protection and Reclamation, the Division of Minerals of the Bureau of Forestry, and the Game Commission in the preparation of this report.

Appreciation is extended to operators and companies who released natural gas production statistics.

PART I. COMPLETION HIGHLIGHTS FOR 1972

SHALLOW HIGHLIGHTS

The lower limits of initial production used in considering a shallow well (Upper Devonian or younger) as a highlight well were established at 50 bopd or more and/or over 2 MMcfcpd (see PR 177, 1969).

There were 84 shallow highlight wells reported in 1972. This increase from 76 reported in 1971 was primarily due to a substantial increase in Upper Devonian Zone B drilling activity. The shallow highlight wells composed 7.3 percent of the total wells reported (Table 5). Table 1 gives highlight well statistics.

Figure 1 shows the distribution of the highlight wells. The following is a brief description of those highlight occurrences about which information was released through the Oil and Gas Division of the Bureau of Land Protection and Reclamation.

Pre-Speechley Gas Development

The pre-Speechley (Upper Devonian Zone B) development gas play in the west-central part of the State increased considerably over that of 1971. The number of highlight wells in this category also increased. In Clearfield County 2 wells were completed with potentials in MMcfcpd of 2.1 in the Salem Pool and 8.0 in the Grampian Field; in Indiana County

7 were completed with potentials in MMcfcpd of 2.6 in the Big Run Pool, 2.0 in the Clarksburg Field, 2.2 in the Creekside Field, 2.1 in the Lewisville Field, 2.2 and 4.8 in the Marion Center Field, and 2.6 in the Richmond Field; and in Westmoreland County 1 was completed with a potential of 2.8 MMcfcpd in the Ambrust Field. No highlight gas wells from this zone were reported from other counties.

Venango Sandstone Oil Development, Forest and Venango Counties

Oil development in the Venango sandstone (Upper Devonian Zone D) fields in Forest and Venango Counties increased considerably during the year. A well in the Cooperstown Field of Venango County had an initial production of 110 bopd from the Venango Second sandstone. There were 97 oil wells completed in Forest County and 209 in Venango County during 1972 compared with 37 Forest County wells and 142 from Venango County in 1971. Production from these wells was mostly from the Red Valley and Venango Second sandstones.

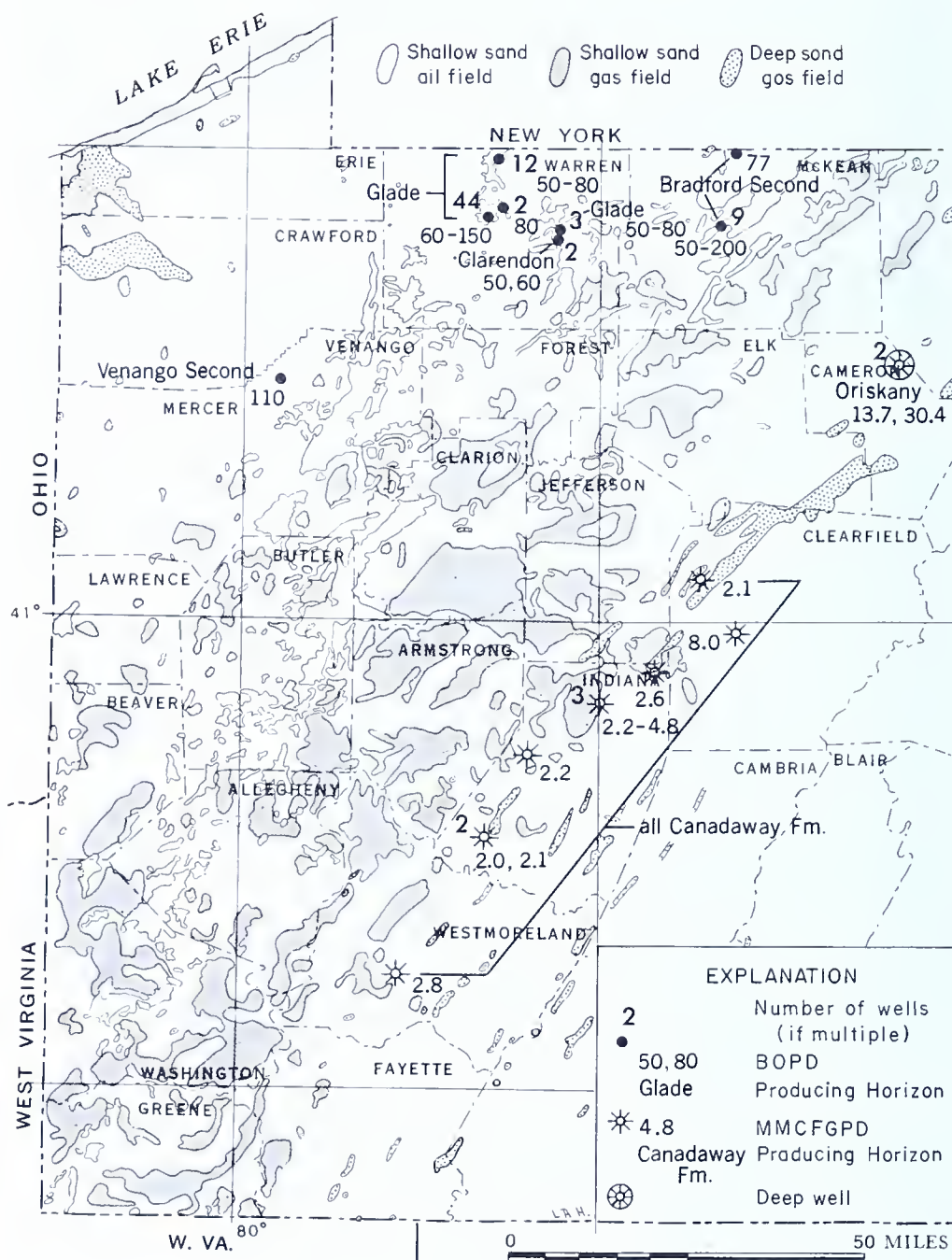
Table 1. *Shallow Highlight Well Statistics*

	1972			1971		
Fields with highlight wells	19			16		
Counties with highlight wells	7			10		
	Wells			Wells		
<i>Producing Zones</i>	<i>Gas</i>	<i>Oil</i>	<i>Total</i>	<i>Gas</i>	<i>Oil</i>	<i>Total</i>
Pre-Speechley in Zone B*	12	10	22	7	4	11
Speechley or younger in Zone B*	0	63	63	0	58	58
Zone D*	0	1	1	0	7	7
Totals	12	74	86	7	69	76

* Zone of Upper Devonian rocks established in Progress Report 178

Glade Sandstone Oil Development

The development of oil production from the Glade and related (Gartland and Clarendon) sandstones of Upper Devonian Zone B in Warren County decreased slightly during the year from that of 1971, although the highlight wells increased from 59 in 1971 to 63 in 1972. Of the 63 in Warren County, 1 had a potential of 60 bopd from the Clarendon sandstone in the Clarendon field, and 1 had a potential of 50 bopd from the Gartland sandstone in the Gartland field. The rest of these wells were productive from the Glade sandstone: 3 from the Glade field with potentials of 50 to 80 bopd, 12 from the Sugar Grove field with potentials of 50 to 80 bopd, 2 from the Yankeebrush pool with potentials of 80 bopd, and 44 from the Youngsville field with potentials of from 60 to 150 bopd.



there were 8 wells with potentials of 50 to 200 bopd, while the remaining 2 were in the Lewis Run field with potentials of 50 to 140 bopd.

DEEP HIGHLIGHTS

The lower limit for deep highlight wells is 10 MMcfgpd for a gas well and 50 bopd for an oil well (see PR 177, 1969).

The East Emporium field in Cameron County was the only area with deep highlight wells. The discovery well had a potential of 13.7 MMcfgpd, while a second well in the field had a potential of 30.4 MMcfgpd. Both wells produce from the Oriskany sandstone.

PART II. OIL AND GAS INDUSTRY ACTIVITY FOR 1972

BASIS FOR STATISTICS

Local industry statistics herein reported are consistent with figures submitted to national industry organizations. Consequently, drilling and completion data are entirely based on drillers' records and location plats forwarded to the Pennsylvania Geological Survey by the Oil and Gas Division of the Bureau of Land Protection and Reclamation of the Department of Environmental Resources, the administrative and regulatory agency for the Oil and Gas Laws. Only those wells for which records and plats have been received within the year are reported. This includes wells drilled in prior years for which records were submitted and received in 1972. It does not include 1972 wells completed for which records had not been submitted within the year.

Oil production and reserve data were obtained from the American Petroleum Institute and gas production and reserve data were obtained from the American Gas Association.

PREVIOUS COMPILATIONS

The summarized records of deep wells (those which reach rocks of Middle Devonian age or older) are shown in Table 13 and the locations of the deep exploratory wells are on Figure 2 (centerfold). For those deep wells drilled prior to 1950, the summarized records and other information on the Commonwealth's oil and gas activities are to be found in Bulletin M 31. Similar information for the 1950 to 1954 period was published in Bulletin M 39 and for the 1955 to 1959 period in Bulletin M 45. For the years 1960 through 1971, this information was published annually in Progress Reports 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183 and 184 of the Pennsylvania Bureau of Topographic and Geologic Survey. Oil and gas developments in the shallow sands (Upper Devonian or younger) are described in Bulletin M 45 and in Progress

Reports 135, 139, 143, 144, 147, 150, 151, 154, 155, 157, 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183 and 184.

A list of deep-well samples on file with the Survey was published in the Survey's *Catalogue of Deep Well Samples and Geophysical Logs to January 1, 1959* (W. R. Wagner, IC 16). Supplemental lists were published in Progress Reports 157, 158, 160, 165, 166, 168, and 173. These and other deep and shallow well samples, geophysical logs, and other well data are also on file with the Survey. An inventory of all deep and shallow well samples is brought up to date annually. It is available on request at cost of reproduction from the Survey's Pittsburgh office.

INDICATED STATUS OF LOCAL INDUSTRY

Oil well completions in 1972 increased 33 percent, Pennsylvania grade crude oil production decreased 10 percent, and oil reserves decreased 22 percent to 36,743,000 barrels. The large decrease in the reserves is due to the re-evaluation of the reserves in Warren and Elk Counties by the API Reserve Committee. Corning grade crude oil production increased to 78,000 barrels for the year, or an increase of 20 percent. The reserves of the Corning grade crude area were increased 57 percent by the API Committee to 602,000 barrels.

Reserves of gas increased 1 percent, while production declined 3 percent and completed gas wells increased 56 percent. The amount of gas in storage decreased 1 percent.

Drilling and Completions

The breakdown of completions by county is shown in Table 2, and the old wells drilled deeper in Table 3.

Table 4 shows that drilling increased 38 percent during 1972 for shallow oil and gas and deep gas. During the year, exploratory and development drilling increased 200 and 35 percent respectively from those of 1971, as shown in Table 5.

The total footage in 1972 was up 33 percent with respect to the amount drilled in 1971 (Table 6).

The 1972 reported discoveries are listed in Table 7 and selected reported exploratory failures are listed in Table 8. The locations of all of the exploratory tests are shown in Figure 2. Number 52 on the map is the location of a dry exploratory test to the Oriskany sandstone in Cameron County that was plugged back, and of a deviated hole drilled to the Oriskany which also was dry. According to API classification these are two separate wells. Figure 3 is a graph of the annual rate of shallow activity in the Commonwealth from 1950 to 1972, while Figure 4 shows the annual rate of deep exploration and development from 1930 to 1972.

Table 2. Well Completions in Pennsylvania, 1972*

County	TOTAL			GAS			OIL			OIL & GAS			DRY		
	No. of Wells	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Open-Flow (Mc/gpd)	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Production (bopd)	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Open-Flow (Mc/gpd)	Aver. Init. Production (bopd)	Aver. Total Depth (feet)	No. of Wells	Aver. Total Depth (feet)	No. of Wells
Allegheny	2	3,685	1	42	4,050	0	0	0	0	0	0	0	1	3,319	1
Armstrong	27	3,419	25	536	3,393	0	0	0	0	0	0	0	2	3,748	2
Beaver	1	1,017	1	3	1,017	0	0	0	0	0	0	0	0	0	0
Bedford	3	5,078	0	0	0	0	0	0	0	0	0	0	3	5,078	3
Bradford	1	5,290	0	0	0	0	0	0	0	0	0	0	1	5,290	1
Butler	3	1,832	1	0	2,313	2	2	1,592	0	0	0	0	0	0	0
Cambria	4	6,743	1	700	8,527	0	0	0	0	0	0	0	3	6,148	3
Cameron	9	5,753	3	16,865	6,656	0	0	0	0	0	0	0	6	5,301	6
Clarion	6	2,791	3	4	2,094	1	0	2,450	0	0	0	0	2	4,008	2
Clearfield	14	3,284	14	1,086	3,284	0	0	0	0	0	0	0	0	0	0
Crawford	13	3,518	8	1,469	3,963	2	0	805	2	500	40	4,219	1	3,982	1
Elk	8	3,196	3	549	2,842	3	15	1,971	0	0	0	0	2	5,565	2
Erie	6	3,047	4	548	3,460	0	0	0	0	0	0	0	2	2,221	2
Fayette	6	4,331	5	1,616	4,567	0	0	0	0	0	0	0	1	3,151	1
Forest	112	892	2	300	1,423	97	6	774	12	215	11	1,711	1	1,452	1
Greene	2	3,253	1	54	3,303	0	0	0	0	0	0	0	1	3,202	1
Indiana	164	3,582	160	933	3,581	0	0	0	0	0	0	0	4	3,599	4
Jefferson	23	3,481	22	648	3,504	0	0	0	0	0	0	0	1	2,960	1
Luverne	1	4,595	0	0	0	0	0	0	0	0	0	0	1	4,595	1
McKean	90	1,857	5	24	3,537	75	23	1,736	0	0	0	0	10	1,924	10
Mercer	5	4,277	1	195	5,418	0	0	0	0	0	0	0	4	3,992	4
Pike	1	13,910	0	0	0	0	0	0	0	0	0	0	1	13,910	1
Potter	3	4,641	0	0	3,854	0	0	0	0	0	0	0	1	6,214	1
Somerset	1	4,904	0	0	0	0	0	0	0	0	0	0	1	4,904	1
Tioga	2	6,254	0	0	0	0	0	0	0	0	0	0	2	6,254	2
Venango	221	820	2	17	1,696	209	2	792	2	100	3	1,990	8	1,048	8
Warren	132	947	1	9	1,230	128	53	925	0	0	0	0	3	1,775	3
Washington	1	2,215	1	1,300	2,215	0	0	0	0	0	0	0	0	0	0
Wayne	1	12,250	0	0	0	0	0	0	0	0	0	0	1	12,250	1
Westmoreland	18	3,677	18	843	3,677	0	0	0	0	0	0	0	0	0	0
TOTAL	880	2,026	284	1,003	3,556	517	18	972	16	237	14	2,059	63	3,772	63

* Does not include service wells, miscellaneous wells, gas storage wells, stratigraphic/core tests or old wells drilled deeper.

Table 3. Old Wells Drilled Deeper in Pennsylvania, 1972

County	TOTAL			GAS			OIL			DRY		
	No. of Wells	Aver. Amt. (feet)	No. of Deepened Wells	Init. (Mcf/gpd)	Aver. Amt. (feet)	No. of Open-Flow Deepened Wells	Init. (bopd)	Aver. Amt. (feet)	No. of Production Deepened Wells	Aver. Amt. (feet)	No. of Wells	Aver. Amt. (feet)
Armstrong	1	1,566	1	170	1,566	0	0	0	0	0	0	0
Cameron	1	3,643	0	0	0	0	0	0	0	0	1	3,643
Clarion	3	1,756	2	2	215	0	0	0	0	0	1	4,838
Greene	2	683	1	834	0	0	0	0	0	0	1	531
Indiana	11	811	7	553	1,197	0	0	0	0	0	4	135
Jefferson	2	270	2	362	270	0	0	0	0	0	0	0
Warren	1	60	0	0	0	1	5	60	0	0	0	0
TOTAL	21	1,017	13	367	904	1	5	60	7	1,364		

Classification		1972		1971		% Change	
	Gas	262		163		+ 61	
	Oil	517		387		+ 34	
	Oil & Gas		14		0	+	
	Dry		39		26	+ 50	
Total			832		576	+ 44	
SHALLOW							
Deepened	Gas	13		21		- 36	
	Oil	1		3		- 67	
	Dry		5		15	- 67	
	Total		19		39	- 51	
Sub Total	Gas	275		184		+ 23	
	Oil	518		390		+ 33	
	Oil & Gas		14		0	+	
	Dry		44		41	+ 7	
Total			851		615	+ 38	
DEEP							
Deepened & New	Gas	22		19		+ 16	
	Oil & Gas		2		0	+ 200	
	Dry		26*		7*	+ 271	
	Total		50		26	+ 93	
PRIMARY SUB TOTAL							
	Gas	297		203		+ 46	
	Oil	518		390		+ 33	
	Oil & Gas		16		0	+	
	Dry		70		48	+ 46	
Total			901		641	+ 41	
Service (Gas & Water Injection Wells)							
Gas Storage			55		60	- 8	
			26**		80**	- 68	
			205		201	+ 2	
Old Well Workovers							
TOTAL ALL WELLS			1187		982	+ 21	

* Includes 2 old wells drilled deeper

** Includes 13 old wells drilled deeper

* Includes 1 old well drilled deeper

** Includes 48 old wells drilled deeper

Table 5. Exploratory and Primary Development Reported, 1972*

Type Well		1972		1971		% Change	
Exploratory	Gas	20		3	1	18	
	Oil		3				+567
	Dry		43				+200
Total (% Successful)				66 (35%)		22 (18%)	+139
Development	Gas	277		200			+39
	Oil		515		389		+32
	Dry		27		30		-10
Oil & Gas			16		0		+
Total (% Successful)				835 (98%)		619 (95%)	+3
Totals	Gas	297		203			+46
	Oil		518		390		+33
	Dry		70		48		+46
Oil & Gas			16		0		+
Grand Total (% Successful)				901 (92%)		641 (93%)	-1

* Above figures include old wells drilled deeper

Table 6. Footage Reported, 1972 and 1971*

No. of Wells	Class	Footage		% Change	Average Ft. Per Well	
		1972	1971		1972	1971
66	Exploratory	275,145	78,119	+ 252	4,169	3,551
835	Development	1,529,065	1,074,398	+ 42	1,831	1,736
55	Service & Stratigraphic	76,746	80,550	- 05	1,395	1,343
956	SUB TOTAL	1,880,956	1,233,067	+ 53	1,968	1,759
26	Gas Storage	41,363	207,622	- 80	1,591	2,595
982	TOTAL	1,922,319	1,440,689	+ 33	1,958	1,845

* Above figures include old wells drilled deeper

At the end of 1972, a total of 3,160 deep wells had been drilled since the beginning of exploration in the deeper horizons. Of the 3,160 deep wells, 1,709 were gas wells, 132 oil and gas wells, 1,104 dry holes, 209 gas storage wells, 4 for waste disposal, and 2 for testing drilling equipment.

Production and Reserves

As shown in Table 9, oil production decreased and gas production decreased during the year. The portion of gas reserves stored at the end of the year decreased 1 percent from that stored at the close of 1971.

The 3,363,000 barrels of Pennsylvania grade crude had a value of \$15,646,000. The 78,000 barrels of Corning grade crude oil were produced from the Medina sandstone (Lower Silurian) in Crawford County. This oil had a value of \$255,400. The increase in the price of Pennsylvania crude oil of 60 cents per barrel was effective December 1, 1972. This increase will have considerable effect on the worth of the crude produced in 1973.

The Bradford District again produced more crude oil than the combined production of the other districts in the State. Only during 1971 did the Bradford District lose this position (Table 10).

Figure 5 shows the annual production of crude oil in Pennsylvania from 1859 to 1972 and in the Bradford District from 1871 to 1972. The monthly variation in crude oil price, production, and well completions is plotted in Figure 6 for the years 1930 to 1972 for the Bradford District.

At the end of 1972 there were approximately 16,600 producing gas wells in the Commonwealth. The 61,838,000 Mcf of shallow gas shown in Table 9 had a value of \$18,551,400, while the 12,120,000 Mcf of deep gas had a value of \$3,757,200. Figure 7 shows the following for the years 1946 to the present: (1) the yearly production of natural gas, (2) the yearly

Table 7. Reported Discoveries in Pennsylvania, 1972

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.)	Name of Formation at T. D.	Prod. Depth (Ft.)	Prod. Formation or Zone	Initial Daily Prod.	Field or Pool Name	Explor. Class	Remarks
51	Cameron	Con. Gas Sup. Corp. 1 Pa. Dept. F & W, Tract 168	11/18/71	6,710	Helderberg	6,689	Oriskany	13,725 Mcf	E. Emporium Field	NFD	Uplip sand wedge out.
22	Clearfield	Con. Gas Sup. Corp.	4/ 6/72	3,450	Canadaway Group	2,966	Canadaway Group	8,009 Mcf	Grampian Field	NFD	Stratigraphic trap.
13	Elk	1 Lillian L. Manley States Oil Co. 1-4186 J. Taylor	9/24/72	3,008	Canadaway Group	2,560	Canadaway Group	1,109 Mcf	Gardner Hill Pool	SPD	Stratigraphic trap in Punxsutawney - Driftwood Field.
39	Fayette	Peoples Nat. Gas Co. 1 Rell Corp.	8/22/72	1,500	Hundred Foot	1,500	Hundred Foot	3,750 Mcf Natural O.F.	Rell Pool	NPD	Stratigraphic trap in Dawson Pool.
42	McKean	Felmont Oil Corp. 1 Kewanee Oil Co.	9/ 8/72	3,850	Bass Island	3,822	Basal Onondaga Sandstone	2,500 Mcf & Condensate	Corydon Field	NFD	On small structural nose plunging south-east.
54	Potter	Cyclops Corp. 1 Pa. Tract 161	8/11/72	6,300	Helderberg	1,204	Canadaway Group	190 Mcf	Red Ridge Pool	SPD	Stratigraphic trap in East Fork-Wharton Field.
1	Warren	Walters & Johnson 2 Fenner Lindblom	2/ 2/72	1,489	Clarendon	1,424	Clarendon	2 bo	Quaker Hill Pool	NPD	Stratigraphic trap in Smith-Corners Field.

Table 8. Selected Exploratory Failures Reported in Pennsylvania, 1972

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.)	Name of Formation at T. D.	Explor. Class or Field	Remarks
63	Bedford	Basil B. Zavoioco 1 Jack E. Colledge ET UX	11/17/71	6,714	Hamilton Group	NFW	Test on highly faulted Graceville dome.
64		Gulf Research & Dev. Co. 1 Kenneth A. Diehl	5/18/72	4,439	Bellefonte Dolomite	NFW	Experimental well to test drilling equipment. Tested thick section in area of sparse information.
44	Bradford	Weaver Oil & Gas Corp. 1 F. J., Jr. & B. E. Bonin	8/22/72	5,290	Helderberg Limestone	NFW	Oriskany test on axis of Rome anticline.
62	Cambria	Felmont Oil Corp. 1 Clearfield Bit. Coal Corp.	7/ 1/72	8,225	Helderberg Limestone	NPW	Oriskany test on seismic anomaly. Found a little gas and considerable salt water.
52	Cameron	Consolidated Gas Sup. Corp.	2/29/72	6,945	Helderberg Limestone	EXT	Original and deviated holes on Sabinsville anticline limited East Emporium field on north.
49		2 Pa. Tract 168 Trend Exploration Limited	6/12/72	6,359	Salina Formation	NFW	Tested pinchout of Oriskany on seismic anomaly.
48		1 P. Schweikart Earl H. Linn and others 279 UNG-Bank of Emporium	10/23/72	5,978	Helderberg Limestone	NFW	Oriskany test on northwest flank of Sabinsville anticline.
60	Clarion	Peoples Natural Gas Co. 6 Peoples Nat. Gas Co.	5/18/72	6,450	Helderberg Limestone	DPT	Drilled on seismic anomaly. Oriskany sandstone absent.
61	Elk	AMOCO Production Co. 1 United Nat. Gas Co.	8/14/72	8,110	Queenston Shale	DPT	Deep horizon test on Hebron anticline.
57	Mercer	Peoples Natural Gas Co. 2 F. Baker and others	5/ 6/72	6,172	Queenston Shale	NFW	Drilled on seismic anomaly. Medina sandstone dry.
46	Pike	TEXACO, Inc. Cl, Pa. Tract 163	12/15/71	13,910	Trenton Dolomite	NFW	Trenton test on geophysical anomaly.
43	Tioga	Anderson Oil Co. 1 T. Davis	8/13/71	5,515	Helderberg Limestone	NFW	Onondaga reef test on seismic anomaly.
45	Wayne	Columbia Gas Trans. Corp. 1 F. A. & M. P. Rodolffy	6/21/72	12,250	Tuscarora Sandstone	NFW	Tuscarora test on seismic anomaly.

Table 9. Production and Reserves in Pennsylvania, 1972

	Production			Reserves				
	1972	1971	% Change	Cumulative to 12/31/72	1972	1971	% Change	
Oil (1,000 bbls.)								
	Penna. Grade	3,363	3,733	-10	1,276,378	36,743	47,103	-22
	Corning Grade	78	65	+20	350	602	383	+57
	TOTAL OIL	3,441	3,798	- 9	1,276,728	37,345	47,486	-21
Natural Gas Liquids (1,000 bbls.)								
		82	79	+ 4	-	735	817	-10
Gas (MMcf)								
	Shallow	61,838	63,584	- 3	-	-	-	-
	Deep	12,120	12,867	- 6	-	-	-	-
	TOTAL GAS	73,958	76,451	- 3	8,677,565	1,406,948*	1,395,931*	+ 1
* Portion Stored Gas								- 1

Table 10. *Average Daily Oil Production*

<i>District</i>	<i>1972</i>	<i>1971</i>	<i>% Change</i>
Bradford Field (Penna. portion only)	4,912	5,000	-2
Middle and Southwestern	4,288	5,222	-18
Medina Corning	214	178	+20
TOTAL	9,414	10,400	-10

consumption of natural gas, (3) the natural gas reserves, and (4) the amount of natural gas in storage. The deep gas production by field and pool is shown in Table 11.

Gas Storage Fields

There were 26 wells drilled for gas storage during the year. Of these 26 wells, 10 were shallow wells, 3 deep wells, and 13 gas storage wells drilled deeper. Several storage wells were worked over during the year (Table 4). Storage well drilling activity was down 68 percent from that of 1971. Figure 8 shows the distribution and lists the names of the current gas storage fields in Pennsylvania. All gas storage fields are required by law to be surrounded by a 3,000-foot-wide buffer zone in which all well locations must be known and pertinent well data on file.

Storage capacity increased during the year to 763,183,373 Mcf. The total gas in storage on December 31, 1972 was 606,941,147 Mcf or 1 percent less than the amount stored on December 31, 1971. The gas in storage consisted of 32,808,866 Mcf of native gas and 574,132,281 Mcf of stored gas.

Subsurface Disposal

Environmental Geology Report 3, a study on *Subsurface Liquid Waste Disposal and Its Feasibility in Pennsylvania* by Neilson Rudd, has just been released by the Bureau of Topographic and Geologic Survey. The publication is available from the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125.

As of January 1, 1973 the only subsurface disposal project was the one being operated by the Peoples Natural Gas Company in Cambria County, where a small amount of brine is being injected into the Murrysville sandstone of basal Mississippian age.

Secondary and Tertiary Recovery Projects

There were 55 water or gas injection wells completed during the year, down 8 percent from those completed in 1971. In McKean County, 75

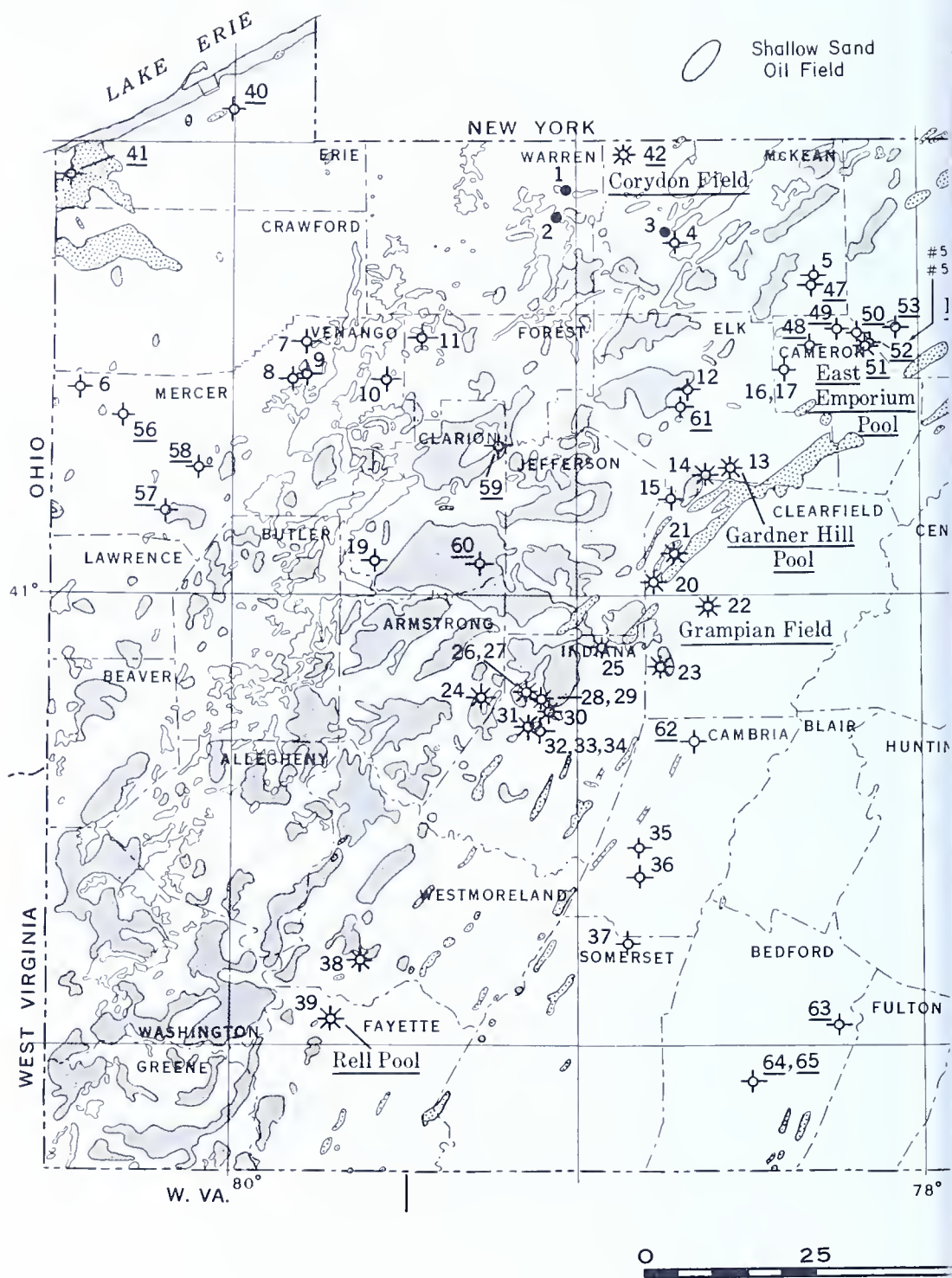
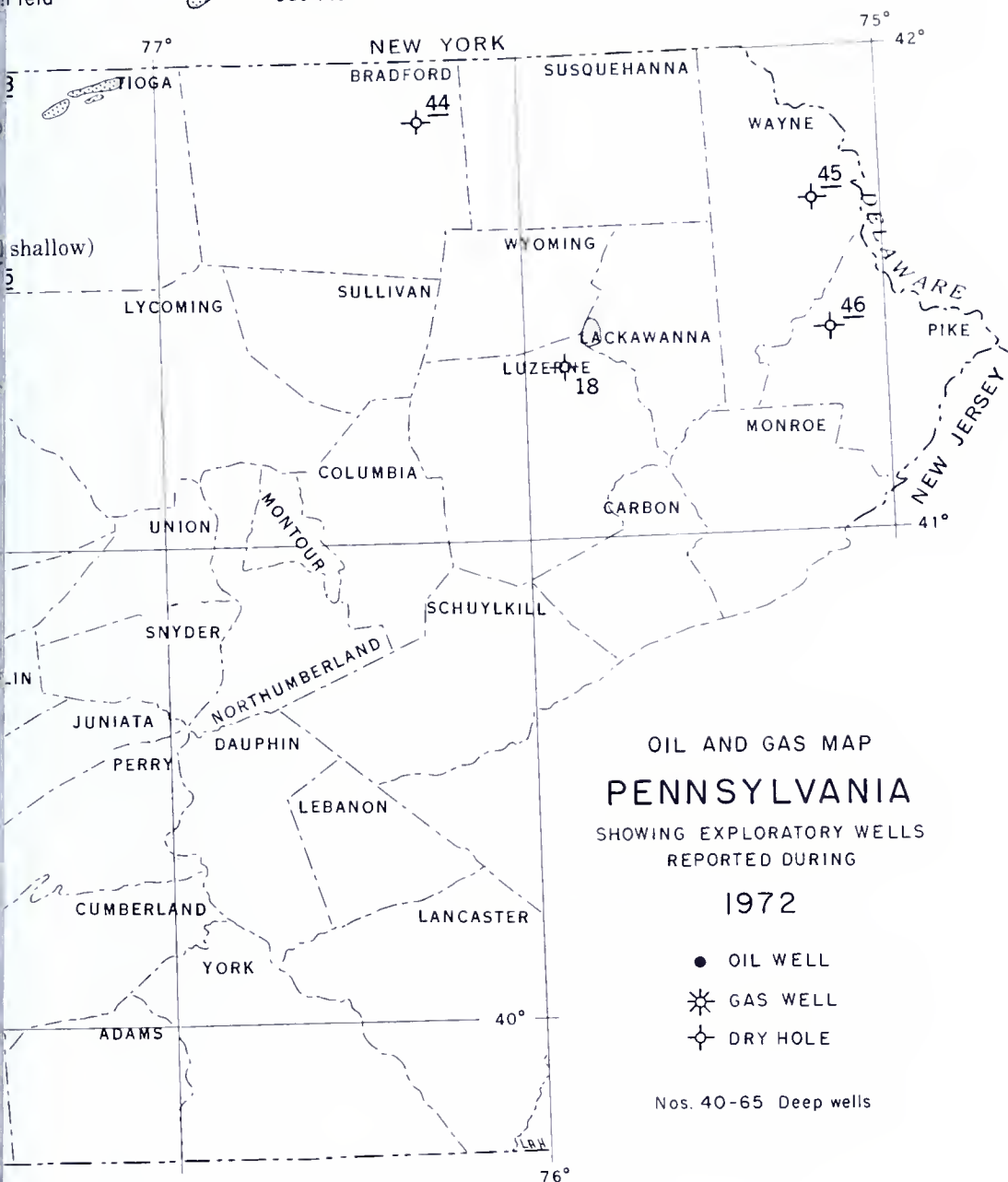


Figure 2. Oil and gas map
re

Shallow Sand
Field



Deep Sand
Gas Field



ania showing exploratory wells
72.

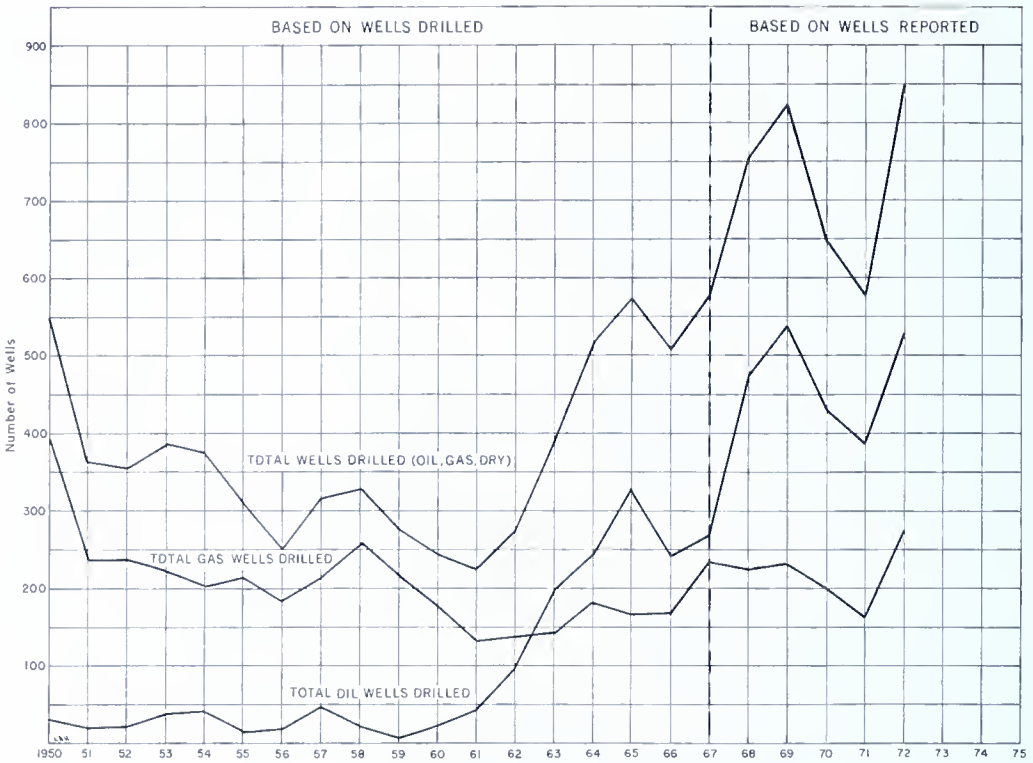


Figure 3. Shallow well activity, 1950-1972.

oil wells were completed, most of them within secondary recovery projects. These projects produced over 50 percent of the crude oil produced annually in Pennsylvania with most of the produced oil coming from the waterfloods in McKean County.

The exhaust gas drive projects operating in Pennsylvania were shut down for reasons not disclosed.

Two of the three Marafloods started in Pennsylvania continued operations during the year. The one in McKean County has now been operating for over 4 years, while the Warren County project has been in operation slightly over one year. The third project is in the development stage. No further information has been released on these projects.

Oil and Gas Prices

Crude oil prices for the year are shown in Table 12. The average well-head price paid for intrastate natural gas during the year is still about 30 cents per Mcf, although the minimum price for new gas is 45 cents per Mcf. So far, the volume of new gas is small compared to the gas produced under the old contracts. One company has just announced an

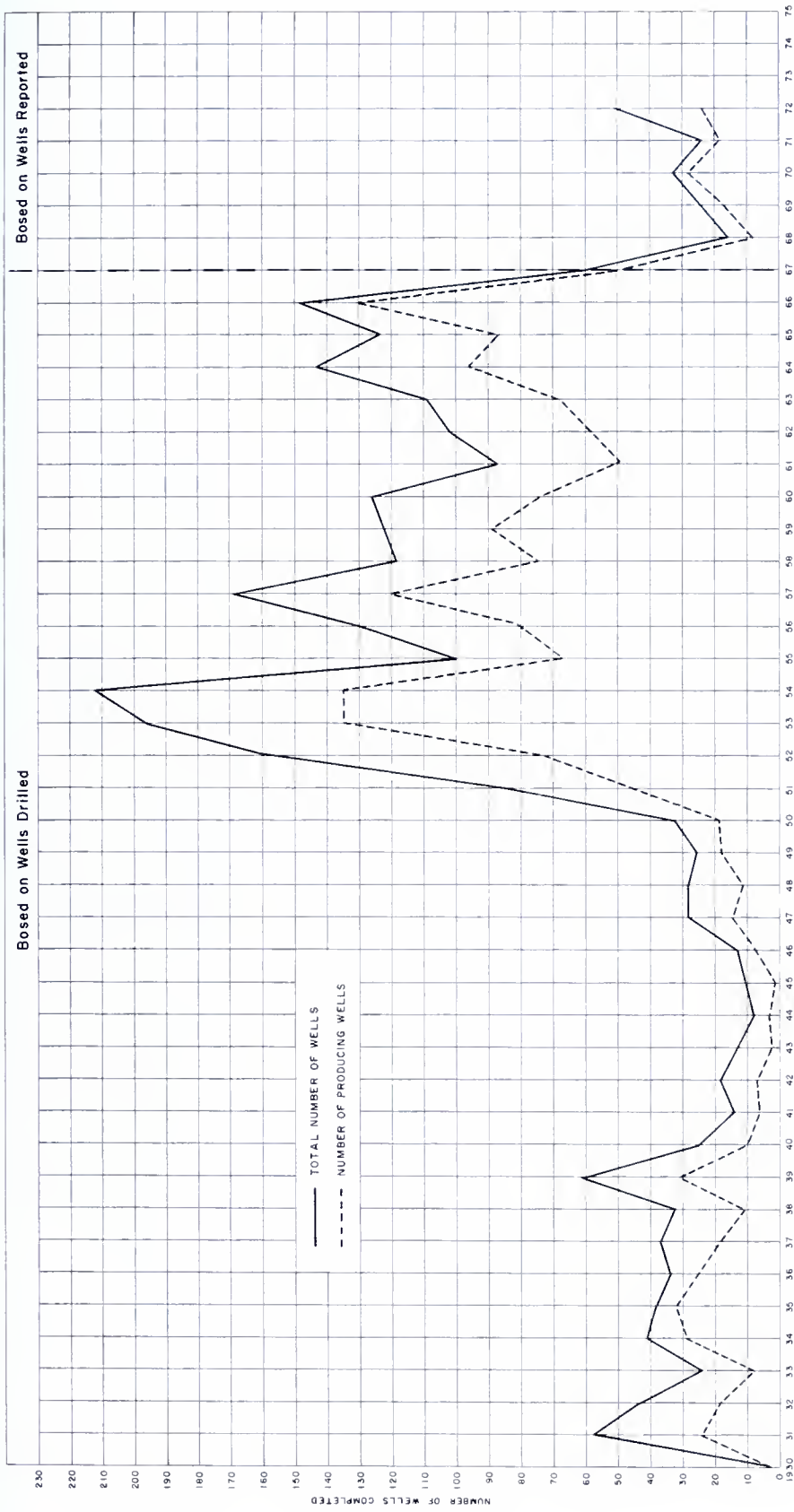


Figure 4. Deep exploration and development, 1930-1972.

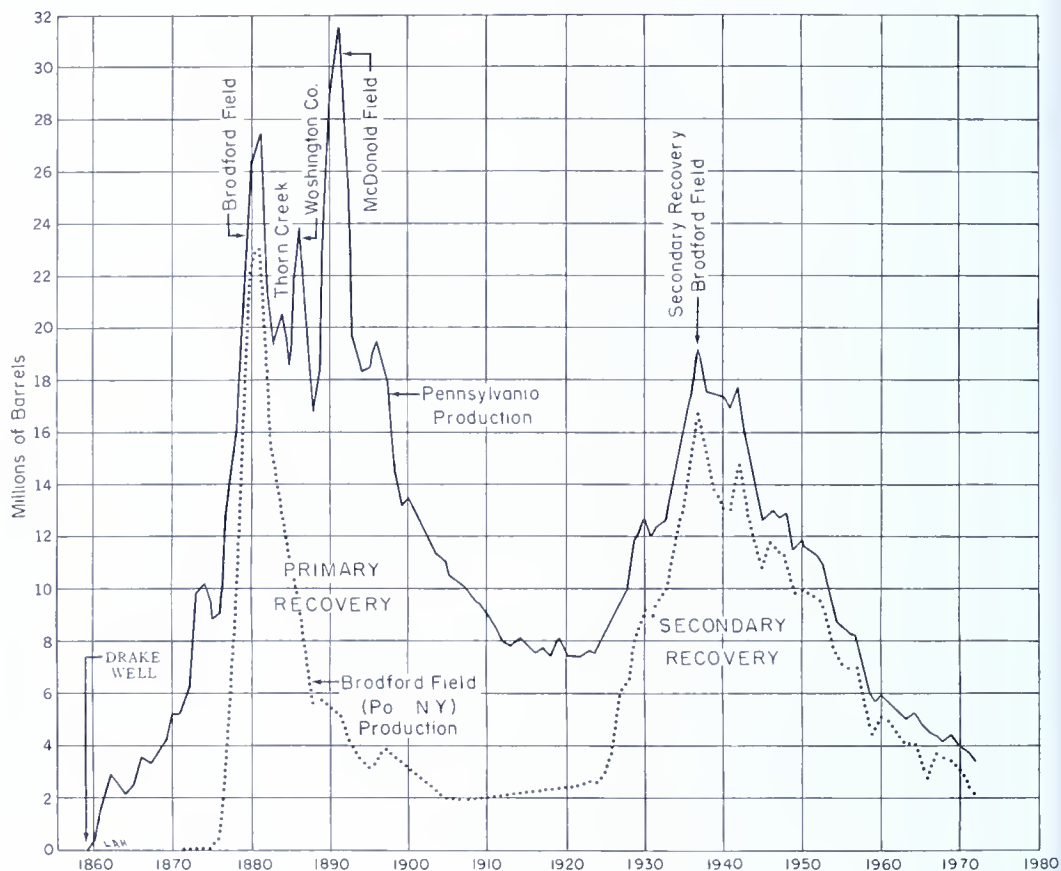


Figure 5. Annual production of crude oil in Pennsylvania.

increase to 60 cents per Mcf for all new gas. The average price for interstate natural gas is about 45 cents per Mcf.

Land Sales

The Pennsylvania Game Commission did not lease any additional acreage in 1972 for the exploration or development of oil and gas. At the end of 1972 the 28 active leases totaled 11,737 acres. Forty-one wells were producing on the 28 leases. No new wells were drilled on the leases during the year, but 6 were acquired on new leases with land purchased and 1 well was plugged and abandoned.

In 1972, 37 tracts of either State Forest or Park lands were leased for the exploration and development of petroleum. From the leasing of these tracts the Department received \$691,094 for 80,458 acres. The average bonus per acre was \$8.59.

Rent and royalty payments relative to oil and gas exploration and development from State Forest and Park lands resulted in a total income

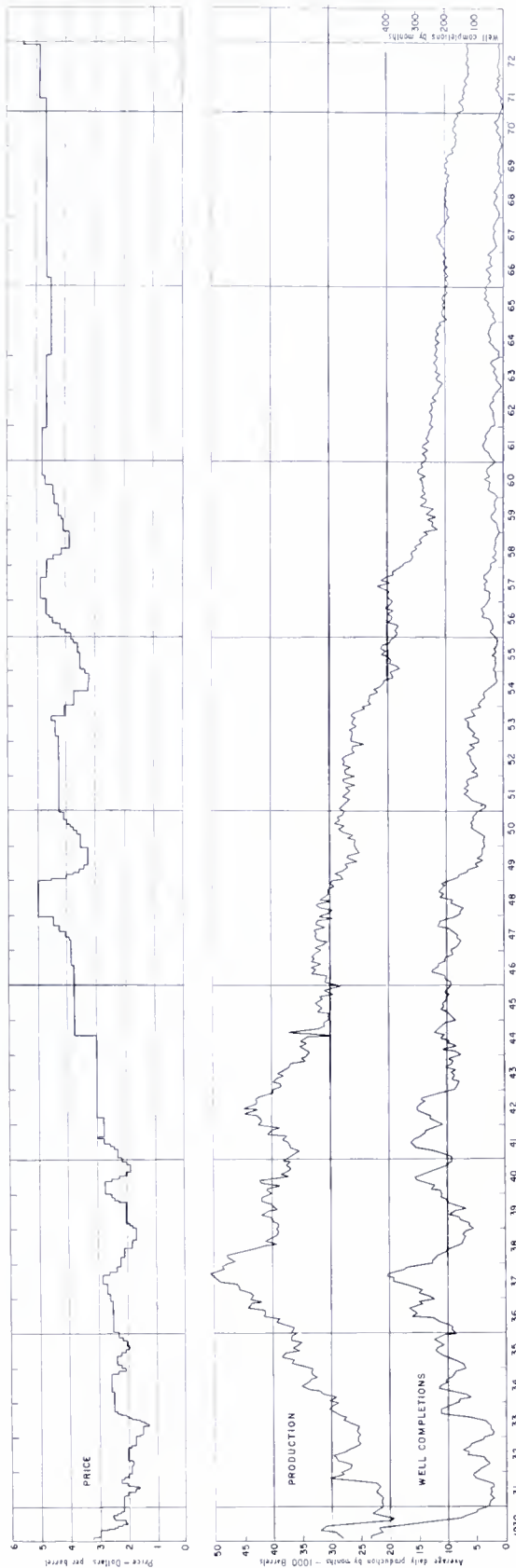


Figure 6. Crude oil prices, production and completions, Bradford District.

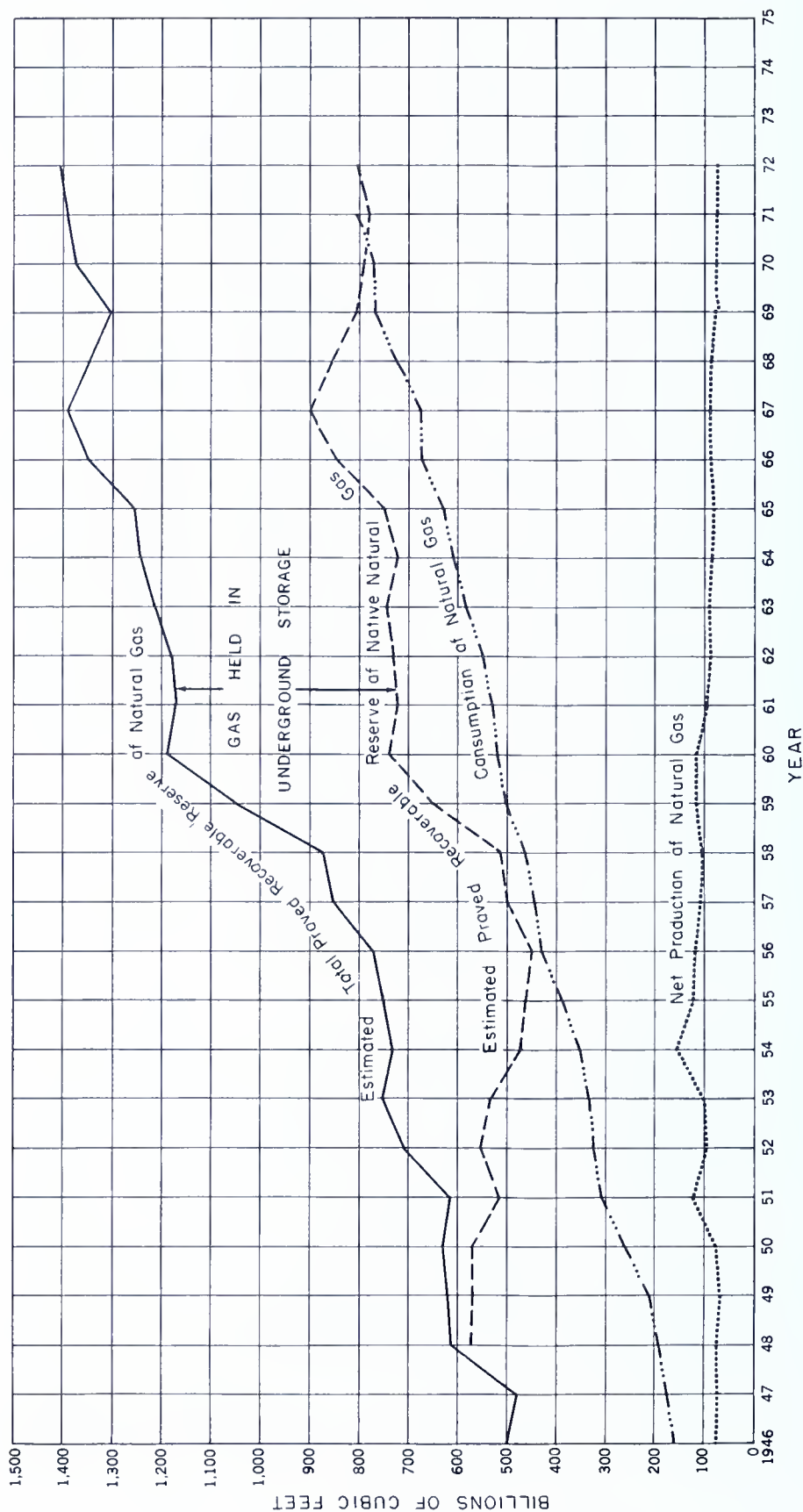


Figure 7. Production, consumption and reserves of natural gas in Pennsylvania.

Table 11. Deep Gas Production in Pennsylvania, 1972

County	Field	Pool	Discovery Date	Cumulative Production at End of 1971 (In Mcf)	Production 1972 (In Mcf)	Cumulative Production at End of 1972 (In Mcf)	Status of Field or Pool at End of 1972
Armstrong	Goheenville* Roaring Run*	Snyderville	10/23/70	29,010	29,344	58,354	Producing
		Roaring Run					
Bedford	Artemus	Oriskany	12/14/70	221,415	244,562	465,977	Producing
		TOTAL					
		Artemus	7/30/63	2,430,000	4,000	2,434,000	Producing
	Five Forks Purcell	Pennland	7/30/63	1,604,000	4,000	1,608,000	Producing
			8/28/64	826,000		826,000	Producing
Cambria	Patton		6/21/62	15,033,000	80,000	15,113,000	Producing
			12/14/57	3,117,000	8,000	3,125,000	Producing
		Burley	1/15/69				Shut-in
Cameron & Elk	Whippoorwill	Pindleton	6/30/69	189,112	1,349,562	1,538,674	Producing
			7/10/61	14,513,000	246,000	14,759,000	Producing
Cameron, Elk Jefferson, Clearfield and Indiana	Punxsutawney* Driftwood	TOTAL	9/15/51	472,927,000	2,934,000	475,861,000	Producing
		Benetzte	1/ 5/53	243,473,000	1,106,000	244,579,000	Producing
		Driftwood	9/15/51				
		Boone Mt.	9/18/58	100,802,000	840,000	101,642,000	Producing
		DuBois	1/ 6/60				
		Sabula	8/26/63	828,000	21,000	849,000	Producing
		Helvetia	5/11/60				
		Reed-	5/ 9/55				
		Deemer	12/ 1/53	123,799,000	911,000	124,710,000	Producing
		Rockton	2/25/55				
Clinton & Potter	Leidy	Sykesville	11/10/60				
		Hicks Run	6/ 7/56	4,025,000	56,000	4,081,000	Producing
		TOTAL	1/ 9/50	160,037,241	68,806	160,106,047	Gas storage and producing
		Ole Bull	1/ 9/59	5,237,209	68,806	5,306,015	Producing

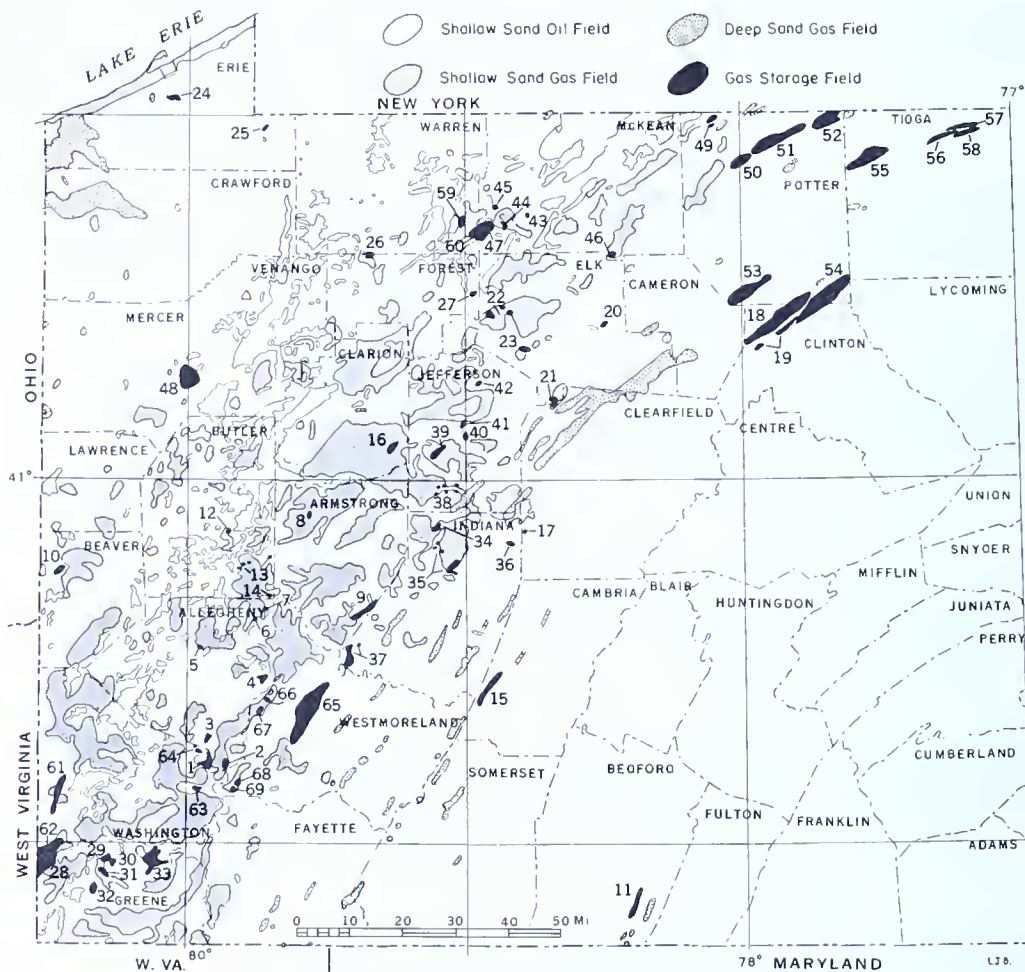
Table 11. (Continued)

County	Field	Pool	Discovery Date	Cumulative Production at End of 1971 (In Mcf)	Production 1972 (In Mcf)	Cumulative Production at End of 1972 (In Mcf)	Status of Field or Pool at End of 1972
Crawford & Erie	Conneaut	TOTAL Bushnell-	2/11/57	28,388,654	1,794,870	30,183,524	Producing and abandoned
		Lexington	12/31/58	13,196,618	606,338	13,803,456	Producing and abandoned
		Indian Springs	9/11/57	10,199,649	804,991	11,004,640	Producing
		Kastle	7/14/62	2,506,916	202,999	2,709,915	Producing
		Lundys Lane	11/ 9/61	1,432,723	133,121	1,565,844	Producing
Erie	Burgess Corry	Pierce	12/31/58	677,017	46,921	723,938	Producing
		TOTAL	10/17/60	141,575	4,266	145,841	Producing
		Beaver Dam	4/29/47	1,042,798	5,780	1,048,578	Gas storage and producing
			5/20/53	189,098	5,780	194,878	Producing
		Meade	8/23/46	4,921,107	2,276	4,923,383	Oriskany gas storage [1 producing Medina well]
Fayette	Ohiopyle Sandy Creek*		12/28/59	3,777,966	130,231	3,908,197	Producing
		Fike	8/ 8/63	494,091	47,440	541,531	Producing
		Quebec Run	8/ 8/63	371,978	21,810	393,788	Producing
			6/31/69	122,113	25,630	147,743	Producing
		Spruell Summit	10/31/61	1,961,027	567,628	2,528,655	Producing
Indiana	Cherry Hill*	TOTAL	3/24/38	42,381,539	222,586	42,604,125	Producing and abandoned
		North Summit	3/24/38	20,979,817	74,825	21,054,642	Producing
		South Summit	5/ 9/42	21,374,572	147,761	21,522,333	Producing
		Crichton Hadden	1/ 9/63 }	2,684,395	82,286	2,766,681	Producing
			7/11/63 }				Producing
Jefferson	Jacksonville Nolo Strongstown		9/21/56	27,818,456	312,675	28,131,131	Producing
			9/30/56	13,199,017	79,374	13,278,391	Shut-in 1971
			12/20/69				
		Elk Run	6/30/65	42,352,000	1,660,000	44,012,000	Producing
		Kilgore	10/26/66				Production not available
Mercer	Henderson Wheatland		7/24/63	137,083	16,066	153,149	Producing

Potter	Ulysses	New Field	10/ 2/39 } 4/ 2/62 }	3,554,411	116,446	3,670,857	Producing
Somerset	Boswell	TOTAL	11/11/58	10,428,448	286,416	10,714,864	Producing
		Boswell	11/11/58	9,540,316	262,296	9,802,612	Producing
		Snyder	6/16/60	888,132	24,120	912,252	Producing
Warren	Sugar Grove	Pettigrew	5/29/70				Production not available
Washington	Daniels Run*	Glyde	9/ 6/61	87,211	5,000**	92,211	Producing
Westmoreland	Blairsville*	Kahl	10/23/62	8,783,957	163,803	8,947,760	Producing
	Latrobe*	Dry Ridge	8/25/46	4,904,201	138,651	5,042,852	Producing
	Jacobs Creek**	Bailey	12/26/61	1,133,492	271,651	1,405,143	Producing
	Lycippus	TOTAL	8/17/49	6,039,837	96,440	6,136,277	Producing and abandoned
		St. Boniface					
		Chapel	9/13/56	5,300,409	96,440	5,396,849	Producing
	Murrysville*	TOTAL	11/ 3/1878	471,304	46,937	518,241	Producing and abandoned
		Duquesne	8/ 8/65	347,411	41,903	389,314	Producing
		Sloan	10/22/63	123,893	5,034	128,927	Producing
Westmoreland &							
Somerset	Johnstown	TOTAL	5/16/57	23,059,882	793,750	23,853,632	Producing and abandoned
		Baldwin	5/22/60				
		Beck	5/16/57	7,981,547	314,370	8,295,917	Producing and abandoned
		Williams	2/14/58	15,078,335	479,380	15,557,715	Producing
Seven Springs		TOTAL	12/15/58	7,421,109	311,314	7,732,423	Producing and abandoned
		Blair	12/ 5/58				
		Tunnel	3/10/65	6,181,563	280,382	6,461,945	Producing
		Seven Springs	8/ 3/66	527,123	30,932	558,055	Producing

* "Shallow" gas production of field not shown

** Estimated



GAS STORAGE FIELDS

- | | | |
|------------------------|------------------|---------------------|
| 1. BUNOLA | 24. SUMMIT | 47. EAST BRANCH "B" |
| 2. GAMBLE HAYDEN | 25. CORRY | 48. HENDERSON |
| 3. TEPE | 26. QUEEN | 49. SHARON |
| 4. MURRYSVILLE | 27. DURHRING | 50. HEBRON |
| 5. MT. ROYAL | 28. MAJORSVILLE | 51. ELLISBURG |
| 6. TARENTUM | 29. SWARTS WEST | 52. HARRISON |
| 7. SMITH PARKE | 30. SWARTS | 53. WHARTON |
| 8. FAIR & HELM | 31. HUNTERS CAVE | 54. GREENLICK |
| 9. SOUTH BEND | 32. HOLBROOK | 55. SABINSVILLE |
| 10. BLACK HAWK | 33. PRATT | 56. PALMER |
| 11. ARTEMAS FIVE FORKS | 34. ALABRAN | 57. TIOGA |
| 12. PORTMAN | 35. KINTER | 58. MEEKER |
| 13. SAXONBURG | 36. CLARK | 59. DEERLICK |
| 14. HUGHES | 37. SCHMIDT | 60. EAST BRANCH "A" |
| 15. RAGER MOUNTAIN | 38. SPRANKLE | 61. DONEGAL |
| 16. TRUITSBURG | 39. GALBRAITH | 62. HEARD |
| 17. GOURLEY-MILLER | 40. IOWA | 63. COLVIN |
| 18. LEIDY | 41. MARKLE | 64. FINLEYVILLE |
| 19. TAMARACK | 42. MUNDERF | 65. OAKFORD |
| 20. ST. MARYS | 43. MEAD RUN | 66. TRAFFORD |
| 21. BOONE MOUNTAIN | 44. KEELOR | 67. IRWIN |
| 22. OWLS NEST | 45. SWEDE HILL | 68. WEBSTER |
| 23. BELMOUTH | 46. WELLENDORF | 69. PATTON |

Figure 8. Map of gas storage fields of Pennsylvania, 1972.

Table 12. *Crude Oil Prices per Barrel, Pennsylvania 1972*

<i>Date</i>	<i>Pennsylvania Grade Crude</i>		
	<i>Bradford District</i>	<i>Middle District</i>	<i>Southwestern District</i>
Jan. 1 to Nov. 30, 1972	\$4.88	\$4.60	\$4.17
Dec. 1 to Dec. 31, 1972	\$5.48	\$5.20	\$4.77
	<i>Crawford County Corning Grade Crude</i>		
Jan. 1 to Nov. 30, 1972		\$3.22	
Dec. 1 to Dec. 31, 1972		\$3.82	

of \$1,011,494. Royalty payments for the year amounted to \$129,225 for 1,281,141 Mcf of gas produced from State lands, while rental payments totaled \$882,269 for tract rentals, gas storage, pipeline rights-of-way, compressor and pumping stations, and seismic surveys.

At the end of the year 234,066 acres of State Forest and Park lands were under lease for oil and gas exploration and development. This figure includes 59,109 acres in gas storage.

During the last two years about six million acres in Pennsylvania have been leased for the exploration and development of petroleum reserves. At the year's end, several deep wildcats were drilling with more to be drilled during 1973. Although the tempo of exploratory drilling has increased, only a small amount of additional reserves have been discovered. Probably the most important gas discovery for the year was the East Emporium field in Cameron County by Consolidated Gas Supply Corporation. Production is from the Oriskany sandstone. Three producers were completed during the year with the best well having an initial production after fracturing of 30,370 Mcfgpd. At the writing of this report two discoveries of gas in the Medina sandstone have been made in Venango County during the early months of 1973. They will be reported in 1973 developments.

Geophysical Activity

More seismic activity took place in 1972 in Pennsylvania than during any other previous year with most of it done by Vibroseis. Seismic crews logged 263 crew weeks during 1972 compared with 147 crew weeks during 1971, an increase of 79 percent. The seismic surveys were made in Armstrong, Beaver, Bedford, Blair, Bradford, Bucks, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Elk, Erie, Fayette, Forest, Fulton, Greene, Indiana, Jefferson, Lycoming, McKean, Pike, Potter, Somerset, Sullivan, Susquehanna, Tioga, and Washington Counties, 29 of the 67 counties in the Commonwealth.

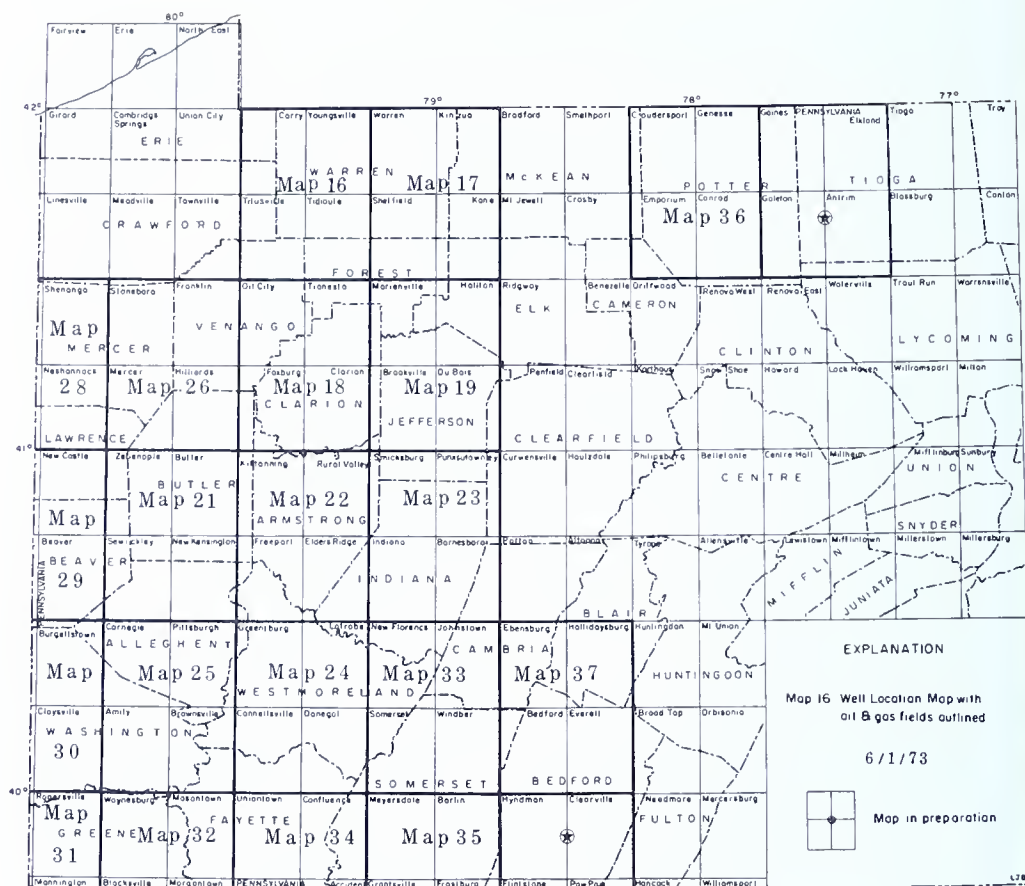


Figure 9. Index of available subsurface base maps.

The seismic activity in Bucks County was part of a seismic sampling program ranging all up and down the Atlantic Coast. In Potter and Tioga Counties operators were trying to delineate reefing in the Lower Devonian as well as deep structures below the Silurian.

The cost to the operators to obtain the seismic data during the year amounted to over \$4,000,000.

INDUSTRY RELATED ACTIVITIES

Subsurface Base Maps

Twenty base maps (Figure 9) showing locations of oil and gas wells and the outlines of the oil and gas fields are now available. Each base map encompasses four 15-minute topographic quadrangles and is at the same scale of 1 inch equals a mile. A five-minute grid, quadrangle names, county boundaries, and major rivers and towns make up the background of the base map. All deep wells known and all shallow wells on record with the Pennsylvania Geological Survey are located, and the

status (dry, oil producing, gas producing, etc.) is shown by symbol. Deep wells (Tully Formation or deeper) are differentiated and elevation and total depth are shown. Symbols indicate the availability of geophysical log and sample data on open file in the Survey's Oil and Gas Division office in Pittsburgh. An index map with the legend shows the outlines of oil and gas fields within the mapped area, thus indicating areas of extensive pre-1956 drilling. A listing of the field names is also included.

Paper prints of the base maps can be obtained by writing to the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125. The cost of each base map is \$0.50, plus a 6 percent sales tax to Pennsylvania residents. A check for the appropriate total amount made out to the Commonwealth of Pennsylvania must accompany the order. When ordering please specify the map number.

A cross index of state permit numbers with quadrangle map numbers used on the base maps is available from the Pittsburgh Branch of the Pennsylvania Geological Survey, 1201 Kossman Building, Stanwix Street, Pittsburgh, Pennsylvania 15222. This index is arranged by quadrangles. Please specify the quadrangle when requesting this literature. Base maps are updated every six months. Maps now available were updated as of June 1, 1973.

Open File Reports

The following reports are on open file (OF) and may be examined at the Oil and Gas Division office of the Bureau of Topographic and Geologic Survey in Pittsburgh. Copies of these reports may be purchased for the cost of duplication.

- OF 1. *Surface to Middle Devonian (Onondaga) Subsurface Stratigraphy, Part 1.*
- OF 2. *Principal natural gas pipelines of Pcnnsylvania. Principal crude oil and product pipelines of Pennsylvania, 1:500,000 maps.*
- OF 3. *Deep sand exploration and gas developmets in Pennsylvania, 1:250,000 map in 6 parts.*
- OF 4. *Salina or equivalent and deeper penetrations of Pcnnsylvania, 1:500,000 map.*
- OF 5. *Tully and deeper formations, brine analyses of Pennsylvania, chart and 1:500,000 map.*
- OF 6. *Stratigraphic framcwork of the Greater Pittsburgh area, Parts 1 and 2.*

PART III. SUMMARIZED RECORDS OF DEEP WELLS REPORTED IN 1972

The information in the following tables has been compiled mainly from drillers' logs and location plats received from the Oil and Gas Division of the Bureau of Land Protection and Reclamation. Other sources are Petroleum Information Corporation (PI), geophysical logs received by the Pennsylvania Geological Survey, and personal communications with oil and gas operators. The identification numbers in Table 13 refer only to well location numbers on Figure 2 of this report. The more significant numbers are the permit numbers by which the wells are filed with the Bureau of Land Protection and Reclamation and the unique quadrangle numbers by which the Survey files the wells and locates them on 15-minute quadrangle maps.

A single asterisk appearing on a log indicates that all formation tops and total depths were picked from a geophysical log. A log without an asterisk means that the formation tops and total depths are from the driller's log or PI. Where a double asterisk appears, the 7½-minute quadrangle name and location are given. These tables are listed alphabetically by county and by name of well.

The producing depth record and the drilling depth record still stand at 11,458 feet in the Tuscarora (Lower Silurian) sandstone and 18,834 feet in the Upper Cambrian, respectively.

Detailed records of two deep wells completed early in 1972 or in 1971 have not been turned in. The available data on these wells are shown below:

#1 Stoddard et al, by Myrle L. Cady, Sugar Grove Township, Warren County, Pennsylvania was completed as a dry hole.

Onondaga	3,042'
Springvale	3,195'-3,215'
Oriskany and Helderberg	(absent)
Bass Island	3,215'
Salina	3,260' to T. D. 3,671'

#1 Ruie S. Taylor et al, Texas Eastern Transmission Corporation, Napier Township, Bedford County, Pennsylvania was completed as a dry hole.

Bloomsburg shale	1,400'-1,405'
Keefer sand	1,760'-2,300'
Tuscarora sand	2,420'-2,775'
Juniata shale	2,775'-4,964'
Beekmantown dolomite	9,068' to T. D. 11,597'

When records of these two wells are received, they will be published in the deep well table in our development report.

MAP NUMBER	63	65	65	65	44	62	Cambrla	36	Cameron
COUNTY	Bedford	Bedford	Bedford	Bedford	Bradford	Cambrla	36	Cameron	Cameron
Permit Number	1454	32	42	41	44	7	31	34	43
NAME OF WELL	H. W. Beam #1	P. V. Moore #1	J. E. Colledge ET UX #1	K. A. Diehl #1	K. A. Diehl #2	F. & B. Bonin #1	Clearfield Bit. Coal Corp. #1	Eastern Assoc. Coal Corp. #1	Emporium Water Co. #1-186
OPERATOR	Peoples Natural Gas Co.	Columbia Gas of Penna.	Basil B. Zavolco	Gulf Research & Development	Gulf Research & Development	Weaver Oil & Gas Corp.	Felmont Oil Corp.	Peoples Natural Gas Co.	Consol. Gas Supply Corp.
TOWNSHIP	Wayne	South Beaver	E. Providence	Colerain	Colerain	Orwell	Chest	Cambrla	Portage
QUADRANGLE	Rural Valley E 6	Beaver A 9	Broad Top G 2	Clearville A 33-1	Clearville A 33-2	Towanda F 5	Patton B 6	Barnesboro I 29	Emporium G 29
LATITUDE	16,700 ft. S 40°55'	1,150 ft. S 40°45'	12,150 ft. S 40°05'	29,300 ft. S 40°00'	29,300 ft. S 40°00'	16,100 ft. S 41°55'	28,300 ft. S 40°45'	16,500 ft. S 40°35'	16,550 ft. S 41°35'
LONGITUDE	6,800 ft. W 79°20'	13,600 ft. W 80°25'	22,850 ft. W 78°10'	22,000 ft. W 78°25'	21,975 ft. W 78°25'	4,200 ft. W 76°15'	21,650 ft. W 78°35'	8,660 ft. W 78°45'	2,450 ft. W 78°10'
DATE COMPLETED	9-21-72	8-26-71	11-18-71	5-18-72	11-28-72	8-22-72	9-15-72	11-1-72	10-3-72
ELEVATION	1514 kb	945 gr	1466 kb	1260 gr	1275 gr	1336 kb	1975 kb	2250 gr	2056 kb
TULLY	*651B-	+4201-4206				3037-3158	*7284-	*7536-	*5005-
ONONDAGA	6985-7012	4358-4374				4926-	8133-8153	8369-8388	6561-6581
CHERT	7012-7122	4374-4562					8153-8222	8388-8465	
ORISKANY	7122-7124	4562-4624				5140-5170	8222-8229	8465-8486	6581-6616
HELDERBERG	7124-	4624-				5170-	8229-	8486-	6584-
KEYSER-BASS ISLAND SALINA									
GUELPH-LOCKPORT BLACK WATER									
CLINTON IRONDEQUOIT									
MEDINA									
QUEENSTON									
TOTAL DEPTH	7152	4674	6714	4439	4082	5290	8250	8538	6639
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Helderberg	Bellefonte	Bellefonte	Helderberg	Helderberg	Helderberg	Helderberg
RESULT	NSOG Abandoned Snyderville Pool	11,010 Mcf AF 2,060 psi/96 hrs. Gas Storage South Beaver Field	NSOG Abandoned Wildcat LOG NOT RELEASED	Abrasive jet experimental test through 4,439' of Bellefonte dolomite. Abandoned Wildcat	Abrasive jet experimental test through 4,082' of Bellefonte dolomite. Abandoned Wildcat	SSG 5140-5170 Abandoned Wildcat	SSG 8200-8210 Abandoned Wildcat	55 Mcf Nat. 700 Mcf AF 3,800 psi/4 days Pindleton Pool	4,632 Mcf Nat. 6,501 Mcf AF 3,754 psi/6 days East Emporium Field

Table 13. (Continued)

MAP NUMBER	51	52	52	52	50	49	48	59	60		
COUNTY	Cameron	Cameron	Cameron	Cameron	Cameron	Cameron	Cameron	Clarion	Clarion	Crawford	Crawford
NAME OF WELL	Pa. Dept. F & W Tract 168 #1	Pa. Dept. F & W Tract 168 #2	Pa. Dept. F & W Tract 168 #2-A	Pa. Dept. F & W Tract 170 WN-1222	Pa. Tract 170 WN-1222	P. Schweikart #1	UNG-Bank of Emporium #1	Mars-Barnsdall #1	Peoples Natural Gas Co. #6	F. Field #2	M. H. Haemer #1
OPERATOR	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Consol. Gas Supply Corp.	Trend Exploration Limited	E. H. Linn et al	Meridian Exploration Corp.	Peoples Natural Gas Co.	Flanigan Bros.	Meridian Oil & Gas Enterprises, Inc.
TOWNSHIP	Portage	Portage	Portage	Portage	Portage	Shippen	Shippen	Farmington	Red Bank	Spring	Summerhill
QUADRANGLE	Emporium H 24	Emporium H 27	Emporium H 27	Emporium G 31	Emporium G 31	Emporium O 28	Crosby I 3	Marienville G 2	Clarion I 8	Girard I 431	Linesville C 42
LATITUDE	11,400 ft. S 41°35'	9,700 ft. S 41°35'	9,700 ft. S 41°35'	550 ft. S 41°35'	29,400 ft. S 41°40'	10,400 ft. S 41°35'	10,400 ft. S 41°35'	650 ft. S 41°20'	4,000 ft. S 41°15'	6,300 ft. S 41°47'30"	2,950 ft. S 41°45'
LONGITUDE	18,700 ft. W 78°05'	15,350 ft. W 78°05'	15,350 ft. W 78°05'	3,750 ft. W 78°10'	19,300 ft. W 78°10'	20,800 ft. W 78°15'	20,800 ft. W 78°15'	18,000 ft. W 79°10'	8,300 ft. W 79°15'	8,550 ft. W 80°15'	5,700 ft. W 80°17'30"
DATE COMPLETE	11-18-71	2-29-72	3-23-72	10-12-72	6-12-72	10-23-72	2-3-72	5-18-72	11-6-71		
ELEVATION	2092 kb	1880 kb	1880 kb	1930 kb	1741 kb	1229 kb	1549 kb	1363 gr	1149 kb	1324 kb	
TULLY	*6022-	*5762-5819 5862-5927	*6274-6378	*5722-	*5623-5686	*5185-5240	*5166-				
ONONDAGA	6634-6653	6829-6859		6305-6330	6182-6190	5825-	5516-			*2540-2715	*2727-
ORISKANY	6653-6683	6859-6902		6330-6337	Oriskany Zone 6193-6199	Absent	Absent	5566-	Absent	2715-2720 2715 SW	2799-2840
HELDERBERG	6683-	6902-		6337-	6199-	5895-	5582-		6343-	2720-	2840-
KEYSER-BASS ISLAND SALINA											
GUELPH-LOCKPORT BLACK WATER											
CLINTON											
IRONDEQUOIT											
MEDINA											
QUEENSTON											
TOTAL DEPTH	6710	6912	6430	6425	6359	5978	5665	6450	3942	4238	
DEEPEST FORMATION REACHED	Heiderberg	Heiderberg	Hamilton	Bass Island	Heiderberg	Heiderberg	Heiderberg	Heiderberg	Heiderberg	Queenston	Queenston
RESULT	2,793 Mcf Nat. 13,725 Mcf AF 3,584 psi/48 hrs. See page 32	N50G Wildcat Vertical Drilling	N50G Wildcat Deviated Drilling	N50G Abandoned Wildcat	N50G Abandoned Wildcat	N50G Abandoned Wildcat	N50G Abandoned Wildcat	N50G Abandoned Wildcat	N50G Wildcat	20 Mcf Nat. 1,000 Mcf AF 1,160 psi/48hrs. See page 32	40 80 AF & 500 Mcf AF 1,150 psi/3 days See page 32

MAP NUMBER	Crawford 389	Crawford 391	Crawford 394	Crawford 402	Crawford 407	Crawford 388	Crawford 390	Crawford 393	Crawford 401	61
COUNTY	Permit Number									Elk 287
NAME OF WELL	R. A. McClinton #1	R. P. Nelson #1	R. P. Nelson #2	R. P. Nelson #3	M. C. Payne #1	J. Baber #1	F. Schweller #1	I. Sliata #1	I. Sliata #2	United Natural Gas Co. #1
OPERATOR	Meridian Oil & Gas Enterprises, Inc.	Flanigan Bros.	Flanigan Bros.	Flanigan Bros.	Flanigan Bros.	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Flanigan Bros.	Flanigan Bros.	AMOCO Production Co.
TOWNSHIP	Spring	Spring	Spring	Spring	Spring	Summerhill	Spring	Spring	Cussewago	Ridgway
QUADRANGLE	Girard I 427 **Conneautville	Girard I 428 **Conneautville	Girard I 435 **Conneautville	Girard I 432 **Conneautville	Girard I 430 **Conneautville	Linesville C 41 **Harmansburg	Girard I 429 **Conneautville	Girard I 433 **Conneautville	Girard I 434 **Conneautville	Ridgway 0 5
LATITUDE	15,100 ft. S 41°50'	6,850 ft. S 41°47'30"	5,200 ft. S 41°47'30"	8,150 ft. S 41°47'30"	150 ft. S 41°50'	2,800 ft. S 41°45'	500 ft. S 41°47'30"	3,150 ft. S 41°47'30"	3,450 ft. S 41°47'30"	300 ft. S 41°25'
LONGITUDE	2,100 ft. W 80°17'30"	6,250 ft. W 80°15'	7,950 ft. W 80°15'	5,450 ft. W 80°15'	8,150 ft. W 80°17'30"	3,450 ft. W 80°17'30"	5,000 ft. W 80°17'30"	6,650 ft. W 80°15'	4,300 ft. W 80°15'	7,100 ft. W 78°40'
DATE COMPLETED	2-10-72	3-6-72	2-29-72	4-17-72	5-6-72	11-23-71	2-24-72	3-14-72	4-24-72	8-14-72
ELEVATION	1236 kb	1139 kb	1180 kb	1188 kb	1169 kb	1324 kb	1220 kb	1182 kb	1130 kb	1466 kb
TULLY										*5505-
ONONDAGA	*2460-	*2510-2715	*2580-2725	*2601-	*2380-	*2615-	*2635-	*2545-	*2515-	6018-
CHERT		Oriskany Horizon 2715- 2715 SW	2725-2730	2744- 2744 SW	2642- 2642 SW	2797-		2727- 2727 SW	2699- 2699 SW	
HELOERBERG										6085-
KEYSER-BASS ISLAND SALINA		2715-	2730-	2744-	2642-	2838-		2727-	2699-	6217- 6310-
GUELPH-LOCKPORT BLACK WATER	3326-	3420-	3425- 3555-	3455-	3490-	3634- 3786-	3405-	3430- 3558-	3400-	
CLINTON	3664-	3750-3760	3680-3690	3770-3780	3575-	3973-	3744-3756	3730-3760	3561- 3707-	
MEGINA	3696-	3780-	3810-	3826-	3650-	4006-	3776-	3810-	3804-	7890-
QUEENSTON	3881-	3960-	3960-	3988-	3790-	4193-	3960-	3970-	3924-	8065-
TOTAL DEPTH	3982	3982	3978	4036	3790	4200	4003	4011	3951	8110
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	1,250 Mcf AF 1,225 psi/3 days Indian Springs Pool	NS06 Abandoned Indian Springs Pool	200 Mcf Nat. 2,000 Mcf AF 1,160 psi/48 hrs. Indian Springs Pool	200 Mcf Nat. 1,500 Mcf AF 1,160 psi/48 hrs. Indian Springs Pool	400 Mcf Nat. 1,000 Mcf AF 1,100 psi/48 hrs. Indian Springs Pool	40 80 & 500 Mcf AF 1,150 psi/3 days Indian Springs Pool	1,000 Mcf AF 1,125 psi/3 days Indian Springs Pool	300 Mcf Nat. 2,000 Mcf AF 1,160 psi/48 hrs. Indian Springs Pool	500 Mcf Nat. 2,000 Mcf AF 1,190 psi/48 hrs. Indian Springs Pool	Show of gas in Upper Devonian sands. Abandoned Wildcat

MAP NUMBER	57	56	54	46	53	40	54	43
COUNTY	Permit Number	57	56	54	46	53	40	43
NAME OF WELL	McKean 9441	Mercer 63	Mercer 61	Mercer 62	Mercer 60	Pike 3	Potter 414	Potter 413
OPERATOR	Kewanee Oil Co. #2	F. Baker, et al #2	Peoples Natural Gas Co.	Sylvania Corp.	Sylvania Corp.	J. & V. Reichart #1	Pa. Dept. F & W Tract 163 #C 1	Pa. Tract 161 #1
TOWNSHIP	Felmont Oil Corp.	Findley	Otter Creek	North	North	Blooming Grove	Texaco, Inc.	Cyclops Corp.
QUADRANGLE	Corydon	Kinzua B 18	Mercer A 4	Shenango F 9	Stoneboro I 12	Hawley B 1	Emporium F 26	Conrad H 58
LATITUDE	9,500 ft. S 42°00'	25,100 ft. S 41°15'	8,400 ft. S 41°25'	20,600 ft. S 41°20'	24,800 ft. S 41°20'	30,300 ft. S 41°30'	28,500 ft. S 41°40'	3,550 ft. S 41°35'
LONGITUDE	10,200 ft. W 78°50'	6,000 ft. W 80°10'	16,850 ft. W 80°15'	1,800 ft. W 80°05'	9,700 ft. W 80°00'	15,900 ft. W 75°05'	18,300 ft. W 78°00'	4,400 ft. W 77°50'
DATE COMPLETED	11-17-72	5-6-72	12-31-71	1-23-72	12-13-71	12-16-71	1-25-72	8-11-72
ELEVATION	1485 gr	1329 kb	1273 kb	1450 kb	1378 kb	1513 kb	1392 gr	1958 kb
TULLY	*3371-	*4051-	*3259-	*4020-	3823-		*5483-	*5485-
ONONDAGA	3690-3764	4207-4345	3412-	4190-	4021-	7600-	6291-6309	6226-
LIMESTONE								
CHERT								
ORISKANY	3764-3776	4345-	3596-	Absent	4157-	8510-	6174-6185	6244-SSG & SW
HELDERBERG	3776-						6185-	6280-
SALINA		4532-				9310-		
GUELPH-LOCKPORT		5452-		5384-5626				
CLINTON		5700-						
MEDINA		5938-						
QUEENSTON		6126-						
TOTAL DEPTH	3779	6200	3652	5628	5418	13,910	6442	6300
DEEPEST FORMATION REACHED	Helderberg	Queenston	Oriskany	Clinton	Clinton	Trenton	Helderberg	Helderberg
RESULT	NSOG Abandoned Corydon Field	NSOG Abandoned Wildcat	NSOG Abandoned Wildcat	NSOG Abandoned Kilgore Pool Extension	410 Mcf Nat. 195 Mcf AF 2,060 psi/48 hrs. Kilgore Pool	Ordovician-11,230' Utica-3,030' Trenton-13,650' NSOG @3420, 3470, & 3490; SSG @12,050 & Trenton Abandoned	4,597 Mcf Nat. 6,732 Mcf AF 3,400 psi/86 hrs. Gas Storage Leidy Pool	190 Mcf Nat. 720 psi/15 days and 5,200' Abandoned upper Devonian Discovery in Red Ridge Pool
								SSG at 1,330' and 5,200' Abandoned Wildcat

Table 13. (Continued)

MAP NUMBER	55	45							
COUNTY	Tioga 53	Tioga 44	Wayne 5						
Permit Number									
NAME OF WELL	B. Locke #1	Pa. State Tract 156 #1	F. & M. Rodolffy #1						
OPERATOR	Consol. Gas Supply Corp.	Columbia Gas Trans. Corp.	Columbia Gas Trans. Corp.						
TOWNSHIP	Chatham	Elk	Damascus						
QUADRANGLE	Elkland 0 42	Galeton I 51	Damascus A 2						
LATITUDE	9,500 ft. S 41°55'	250 ft. S 41°35'	24,700 ft. S 41°45'						
LONGITUDE	13,200 ft. W 77°25'	6,800 ft. W 77°30'	3,850 ft. W 75°10'						
DATE COMPLETED	7-18-72	8-13-72	6-21-72						
ELEVATION	1751 gr	1862 gr	1505 kb						
TULLY	*3850-	*5735-							
ONONDAGA	4652-4668		*8000-						
LIMESTONE									
CHERT									
ORISKANY	4668-4690		8642-8685						
HELDERBERG	4690-		8685-						
SALINA			9310-						
GUELPH-LOCKPORT									
CLINTON			10890-						
MEDINA (TUSCARORA)			11936-						
QUEENSTON									
TOTAL DEPTH	4797	6996	12,250						
DEEPEST FORMATION REACHED	Helderberg	Marcellus	Tuscarora						
RESULT	33,074 Mcf Nat. 73,628 Mcf AF 1,970 psi/48 hrs. Gas Storage Sabinsville Field	NSOG Abandoned Wildcat	NSOG Abandoned Wildcat						